

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1 - 16. (Canceled)

1 17. (New): A data recording method for recording data on a recording
2 medium comprising steps of:
3 forming a data block organized as a plurality of first data columns arranged in a
4 plurality of rows, each first data column comprising a plurality of bytes;
5 for each row in said data block, adding a plurality of second data columns to
6 include an error correcting code parity comprising a plurality of bytes;
7 rearranging an order of bytes of said first data columns according to two or more
8 rearranging rules, each rearranging rule being applied to one of said first columns, thereby
9 rearranging bytes comprising each of said first columns in said data block to produce a
10 rearranged data block; and
11 recording said rearranged data block on a recording medium.

1 18. (New): The data recording method according to claim 17, wherein each of
2 said first data columns includes an error correcting code.

1 19. (New): The data recording method according to claim 17, wherein said
2 step of rearranging includes rearranging said order of said of bytes exclusive of bytes that relate
3 to identification information.

1 20. (New): The data recording method according to claim 17, wherein said
2 step of rearranging includes applying a first rearranging rule to a plurality of said first data
3 columns, whereby said first rearranging rule is applied to a plurality of said rows.

1 21. (New): The data recording method according to claim 17, wherein one of
2 said rearrangement rules is an M-series rule.

1 22. (New): The data recording method according to claim 17, wherein one of
2 said rearranging rules is an arithmetic progression.

1 23. (New): The data recording method according to claim 17, wherein said
2 step of rearranging is performed on groups of bytes, wherein a group of bytes in a first data
3 column is rearranged as a unit.

1 24. (New): The data recording method according to claim 17, wherein said
2 step of recording data comprises a step of modulating said bytes, wherein rearranged data in said
3 first columns are modulated.

1 25. (New): The data recording apparatus of claim 17 wherein said record
2 medium is a digital versatile disk (DVD) recording medium.

1 26. (New): The data recording apparatus of claim 25 wherein said data block
2 is an ECC (error correction code) data block.

1 27. (New): The data recording apparatus of claim 26 wherein said ECC data
2 block includes PI (parity of inner code) data and PO (parity of outer code) data, wherein said PI
3 data is rearranged by said signal processing circuit.

1 28. (New): A data reproducing method of reproducing data recorded on a
2 record medium, comprising the steps of:

3 forming a data block including a plurality of first data columns stacked in a
4 plurality of rows, each first data column including a plurality of first bytes that were previously
5 interleaved according to first rearranging rules;

6 rearranging an order of said first bytes of said first data columns according to
7 second rearranging rules each of which is applied to one of said first data columns, wherein there
8 are at least two first rearranging rules and at least two second rearranging rules so that
9 rearranging of said first bytes is performed by applying at least two different rearranging rules to
10 said data block; and

11 executing an error correcting processing to data rearranged.

1 29. (New): A data recording apparatus, comprising:

2 a circuit for forming a data block including a plurality of first data columns
3 stacked in a plurality of rows; each first data column including a plurality of first bytes and an
4 error correcting code parity;

5 a signal processing circuit for rearranging an order of said first bytes according to
6 a plurality of rearranging rules each of which is applied to one of said first columns, rearranging
7 of said first bytes in said data block being performed by using at least two different rearranging
8 rules;

9 a modulation circuit for modulating a data column in which an order of bytes is
10 rearranged by said signal processing circuit; and

11 means for recording data column modulated on a record medium.

1 30. (New): The data recording apparatus of claim 29 wherein said record
2 medium is a digital versatile disk (DVD) recording medium.

1 31. (New): The data recording apparatus of claim 30 wherein said data block
2 is an ECC (error correction code) data block.

1 32. (New): The data recording apparatus of claim 31 wherein said ECC data
2 block includes PI (parity of inner code) data and PO (parity of outer code) data, wherein said PI
3 data is rearranged by said signal processing circuit.

1 33. (New): A data reproducing apparatus, comprising:
2 a demodulating circuit for demodulating data recorded on a record medium;
3 a signal processing circuit for, on a plurality of data columns demodulated by said
4 demodulating circuit, rearranging an order of bytes of said data columns according to rearranging
5 rules each of which is applied to one of said data columns, rearranging of said bytes being
6 performed by applying at least two different rearranging rules to said data columns; and
7 a circuit for correcting an error included in data in which an order of bytes is
8 rearranged by said signal processing circuit.